IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

LINEX TECHNOLOGIES, INC.,	§	
	§	
Plaintiff,	§	
	§	
v.	§	**CIVIL ACTION No. 2:07cv222**
	§	
BELKIN INTERNATIONAL, INC., et al.,	§	
	§	
	§	
Defendants.	§	

MEMORANDUM OPINION AND ORDER

This claim construction opinion construes the disputed terms in U.S. Patent No. 6,757,322 ("the '322 patent"). On June 1, 2007, Plaintiff Linex Technologies, Inc. ("Linex") filed the instant action against fifteen Defendants, alleging infringement of claims 1, 9, 25, and 33 of the '322 patent. (Doc. No. 1). To date, there are only two active litigants remaining: Plaintiff Linex Technologies, Inc. ("Linex") and Defendant Phoebe Micro, Inc. ("Phoebe").[1] The parties have submitted a number of claim terms for construction. Plaintiff has filed an Opening Claim Construction Brief ("Opening") (Doc. No. 266) and a Reply Claim Construction Brief ("Reply") (Doc. No. 274). Defendant also filed a Responsive Claim Construction Brief ("Resp.") (Doc. No. 273). The Court held a *Markman* hearing on January 15, 2009. (Doc. No. 276). For the reasons stated herein, the Court adopts the constructions set forth below.

[1]On December 12, 2008 Plaintiff represented that the only active litigants in the instant action were Plaintiff Linex and Defendants Phoebe and Toshiba America Information Systems, Inc. ("Toshiba"). (Doc. No. 260). On January 5, 2009, Plaintiff filed a Notice of Settlement indicating that Plaintiff Linex and Defendant Toshiba had reached a settlement agreement and would soon be filing a joint stipulation of dismissal of the relevant claims. (Doc. No. 272).

BACKGROUND

The '322 patent issued to Plaintiff Linex as assignee on June 29, 2004, naming Dr. Donald L. Schilling as the inventor. The asserted claims of the '322 patent teach wireless communications systems and methods using multiple transmission and reception antennas in order to overcome fading and shadowing effects found in a multipath environment.

Plaintiff asserts four claims of the '322 patent: claims 1, 9, 25, and 33. Claims 1 and 9 are method claims, while claims 25 and 33 are system claims. The asserted claims are provided below with the disputed claim terms set forth in bold. Claim 1 provides:

> 1. A method for receiving data having symbols, with the **data having symbols demultiplexed into a plurality of subchannels of data, with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum-subchannel signals**, respectively, with the plurality of spread-spectrum-subchannel signals radiated, using radio waves, from a plurality of antennas as a plurality of spread-spectrum signals, respectively, with the **plurality of spread-spectrum signals** passing through a communications channel having multipath, thereby generating, from the **plurality of spread-spectrum signals**, at least a first spread-spectrum signal having a first channel of data arriving from a first path of the multipath, and a second spread-spectrum signal having a second channel of data arriving from a second path of the multipath, comprising the steps of:
>
> receiving the first spread-spectrum signal and the second spread-spectrum signal with a plurality of receiver antennas;
>
> **detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively**;
>
> **combining**, from each receiver antenna of the plurality of receiver antennas, each of the first plurality of detected spread-spectrum signals, thereby generating a first combined signal; and
>
> **combining**, from each receiver antenna of the plurality of

receiver antennas, each of the second plurality of detected spread-spectrum signals, thereby generating a second combined signal.

'322 patent at 14:8–38. Claim 9 provides:

9. A system for receiving data having symbols, with the **data having symbols demultiplexed into a plurality of subchannels of data, with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum-subchannel signals**, respectively, with the plurality of **spread-spectrum-subchannel signals** radiated, using radio waves, from a plurality of antennas as a plurality fo spread-spectrum signals, respectively, with the **plurality of spread-spectrum signals** passing through a communications channel having multipath, thereby generating, from the **plurality of spread-spectrum signals**, at least a first spread-spectrum signal having a first channel of data arriving from a first path of the multipath, and a second spread-spectrum signal having a second channel of data arriving from a second path of the multipath, comprising:

a plurality of receiver antennas for receiving the first spread-spectrum signal and the second spread-spectrum signal;

a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively; and

a plurality of combiners for **combining**, from each receiver antenna of the plurality of receiver antennas, each of the first plurality of detected spread-spectrum signals, thereby generating a first combined signal, and for **combining**, from each receiver antenna of the plurality of receiver antennas, each of the second plurality of detected spread-spectrum signals, thereby generating a second combined signal.

'322 patent at 15:41–67, 16:1–5. Claim 25 provides:

25. A **multiple input multiple output (MIMO)** method improvement, for transmitting data having symbols, over a communications channel, comprising the steps of:

demultiplexing the data into a plurality of subchannels of data;

spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals, respectively;

radiating from a plurality of antennas, using radio waves, the plurality of **spread-spectrum-subchannel signals**, over the communications channel, as a **plurality of spread-spectrum signals**, respectively;

imparting, from the communications channel, multipath on the **plurality of spread-spectrum signals**, thereby generating at least a first spread-spectrum signal having a first channel of data arriving from a first path of the multipath, and a second spread-spectrum signal having a second channel of data arriving from a second path of the multipath;

receiving the first spread-spectrum signal and the second spread-spectrum signal with a plurality of receiver antennas;

detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively;

combining, from each receiver antenna of the plurality of receiver antennas, each of the first plurality of detected spread-spectrum signals, thereby generating a first combined signal; and

combining, from each receiver antenna of the plurality of receiver antennas, each of the second plurality of detected spread-spectrum signals, thereby generating a second combined signal.

‘322 patent at 18:43–67, 19:1–11. Finally, claim 33 provides:

33. A **multiple input multiple output (MIMO)** method system, for transmitting data having symbols, over a communications channel, comprising:

a demultiplexer for demultiplexing the data into a plurality of subchannels of data;

a plurality of spread-spectrum devices for spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of

> **spread-spectrum subchannel signals, respectively**;
> a plurality of transmitter antennas for radiating, using radio waves, the plurality of **spread-spectrum subchannel signals**, over the communications channel, as a **plurality of spread-spectrum signals**, respectively;
> said communications channel for imparting multipath on the **plurality of spread-spectrum signals**, thereby generating at least a first spread-spectrum signal having a first channel of data arriving from a first path of the multipath, and a second spread-spectrum signal having a second channel of data arriving from a second path of the multipath;
> a plurality of receiver antennas for receiving the first spread-spectrum signal and the second spread-spectrum signal;
> **a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively**; and
> a plurality of combiners for **combining**, from each receiver antenna of the plurality of receiver antennas, each of the first plurality of detected spread-spectrum signals, thereby generating a first combined signal, and for **combining**, from each receiver antenna of the plurality of receiver antennas, each of the second plurality of detected spread-spectrum signals, thereby generating a second combined signal.

'322 patent at 20:13–50. The parties submitted a total of twelve terms for construction.[2] Each disputed term will be addressed herein.

LEGAL STANDARD

The claims of a patent define the patented invention. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 389-90 (1996). Under *Markman v. Westview Instruments, Inc.*, district courts

[2]At the hearing, the parties were able to reach agreement as to two of these terms: "multiple input multiple output" or "MIMO" and "demultiplexing."

construe the scope and meaning of disputed patent claims as a matter of law. 517 U.S. 370, 373 (1996). Claims are construed from the standpoint of a person having ordinary skill in the art, *Brookhill-Wilk 1, LLC v. Intuitive Surgical, Inc.*, 334 F.3d 1294, 1298 (Fed. Cir. 2003), and according to the Federal Circuit, the court must "indulge a heavy presumption that a claim term carries its ordinary and customary meaning." *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (internal quotations omitted); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) ("the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention").

The first step of the claim construction analysis requires the court to look to the intrinsic evidence, beginning with the words of the claims themselves, followed by the specification and—if in evidence—the prosecution history. *Teleflex, Inc. v. Ficosa N. Am.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582-84 (Fed. Cir. 1996); *see also Phillips*, 415 F.3d at 1315 ("the claims themselves provide substantial guidance as to the meaning of particular claim terms"). A term's context in the asserted claim can be very instructive, and other claims may aid in determining the term's meaning because claim terms are typically used consistently throughout the patent. *Phillips*, 415 F.3d at 1314.

The claims of a patent "must [also] be read in view of the specification, of which they are a part" because the specification may help resolve ambiguity where the words in the claims lack clarity. *Id.* at 1315; *Teleflex*, 299 F.3d at 1325. Yet, the written description should not trump the clear meaning of the claim terms. *Tate Access Floors, Inc. v. Maxcess Techs., Inc.*, 222 F.3d

958, 966 (Fed. Cir. 2000) ("[a]lthough claims must be read in light of the specification of which they are part . . . it is improper to read limitations from the written description into a claim"); *Arbitron, Inc. v. Int'l Demographics Inc.*, No. 2:07-cv-434, 2009 WL 68875, *3 (E.D. Tex. Jan. 8, 2009) ("although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments").

Finally, an inventor may "choose [] to be his or her own lexicographer" by expressly defining terms in the specification. *Johnson Worldwide Assocs., Inc. v. Zebco Corp.*, 175 F.3d 985, 990 (Fed. Cir. 1999). A court may examine the prosecution history to determine whether the patentee intended to deviate from a term's ordinary and customary meaning. *Teleflex*, 299 F.3d at 1326. The prosecution history may "limit [] the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." *Id.* (quoting *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985)). If analysis of the intrinsic evidence resolves any ambiguity in disputed claim terms, then "it is improper to rely on extrinsic evidence." *Vitronics*, 90 F.3d at 1583 (citations omitted). Extrinsic evidence—such as expert testimony, dictionaries, and treatises—may be used only if ambiguities remain after analyzing all the intrinsic evidence. *Id.* at 1584.

DISCUSSION

The parties present the following claim terms and phrases for construction:

1) "spread-spectrum-subchannel signals;"

2) "with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum subchannel signals, respectively;"

3) "spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals, respectively;"

4) "plurality of spread-spectrum signals;"

5) "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively;"

6) "combining" or "combining, from each receiver antenna of the plurality of receiver antennas, each of the first plurality of detected spread-spectrum signals, thereby generating a first combined signal; and combining, from each receiver antenna of the plurality of receiver antennas, each of the second plurality of detected spread-spectrum signals, thereby generating a second combined signal;"[3]

7) "multiple input multiple output" or "MIMO;"[4]

8) "demultiplexing the data into a plurality of subchannels of data;"

9) "data having symbols demultiplexed into a plurality of subchannels of data;"

10) "demultiplexer for demultiplexing the data into a plurality of subchannels of data;"[5]

11) "a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively;" and

12) "a plurality of spread-spectrum devices for spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals, respectively."

---

[3]This term was not included in the parties' Joint Claim Construction and Prehearing Statement Pursuant to Patent Rule 4-3 with Respect to U.S. Patent No. 6,757,322. (Doc. No. 246). Plaintiff asserts that the parties had agreed that the term "combining" should be construed, and now Defendant "has greatly expanded the disputed term for construction" by presenting this particular term. REPLY at 2. As will be discussed in section VI, *infra*, Plaintiff therefore objects to the construction of this term. *See id.* at 1–3.

[4]At the hearing, the parties were able to reach agreement as to the proper construction of this term. Therefore, the Court will adopt the parties' agreed construction.

[5]With respect to the "demultiplexed" and "demultiplexing" terms, the parties were able to reach an agreement at the hearing as to the proper construction of "demultiplexing" Therefore, the Court will adopt the parties' agreed construction.

These twelve claim terms are subject to just four major disputes. First, the parties disagree about the proper scope of "spread-spectrum," and therefore all terms which relate to "spread-spectrum" are in dispute. Second, the parties dispute how many and what portion of the transmitted signals are "detected" at each receiver antenna. Third, the parties dispute whether the patent requires combining both space- and time-diverse signals.[6] Finally, the parties dispute whether the final two terms should be construed as means-plus-function terms.

I. "spread-spectrum subchannel signals"[7]

Plaintiff's Proposed Construction	**Defendant's Proposed Construction**
subchannel signals processed using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	signals, each corresponding to a different one of the subchannels of data, and each having been processed with a different pseudonoise (PN) chip-sequence signal

Plaintiff contends that the parties' main dispute underlying all of the spread-spectrum terms centers on a different understanding of spread-spectrum modulation. OPENING at 10. Plaintiff asserts that spread-spectrum modulation "spreads a signal carrying data across an allowed spectrum of frequencies, such that the allowed spectrum is typically greater than or equal to the bandwidth of frequencies required to carry the provided data." *Id.* Plaintiff argues that Defendant's proposed construction improperly limits the claimed spread-spectrum system to that disclosed in the preferred embodiment. *Id.* at 14. Further, Plaintiff contends that adopting Defendant's proposed construction

[6]The '322 patent and the parties use the terms "time and space diversity" and "RAKE and space diversity" interchangeably. For the purposes of clarity, the Court will refer to these concepts as "time and space diversity," where possible.

[7]The term "spread-spectrum subchannel signals" is contained in all of the asserted claims: 1, 9, 25, and 33.

would violate the doctrine of claim differentiation, as dependent claim 49 specifies a particular type of spread-spectrum that uses chip sequence signals. REPLY at 5.

Defendant responds that the term is defined by the specification. RESP. at 19. Defendant argues that the specification repeatedly points to a chip-sequence code and notes that the signals are created or defined by processing the signal with the chip-sequence spreading code. *Id.* at 19–20. Specifically, Defendant asserts that the '322 patent discloses that spread-spectrum processing is performed by a "chip sequence signal generator" involving a pseudonoise ("PN") spreading code. *Id.* Finally, Defendant argues that Plaintiff's proposed construction is overly broad and ignores the portion of the claim that requires that the subchannels be spread. *Id.* at 21–23. Defendant also argues that spread-spectrum processing is not a "form of communication." *Id.* at 21–22.

As previously noted, the parties' main dispute underlying all of the spread-spectrum terms centers on a different understanding of spread-spectrum modulation. *See* OPENING at 10. While actively contested, the parties do agree on a number of aspects of spread-spectrum modulation. The parties agree that spread-spectrum systems spread the transmitted signal over a particular bandwidth of frequencies that is generally larger than that required to carry the signal. *See id.* at 12; DEFENDANT'S TUTORIAL ON WLAN CONCEPTS ("DEF.'S TUTORIAL") at 50. The parties also agree that direct sequence ("DS"), frequency hopping ("FH"), and time hopping ("TH") are all spread-spectrum modulation techniques. OPENING at 14; DEF.'S TUTORIAL at 55.

However, the parties disagree on the breadth of modulation techniques encompassed by the term "spread-spectrum." Plaintiff asserts that Defendant's proposed construction is unduly narrow because it limits the term to DS systems and omits FH and all multicarrier spread-spectrum systems such as orthogonal frequency division multiplexing ("OFDM"). OPENING at 14. Defendant, on the

other hand, asserts that Plaintiff's construction is overly broad and would improperly encompass OFDM processing. RESP. at 21. This dispute essentially centers on how spread-spectrum signals are processed. Defendant asserts that the '322 patent requires that spread-spectrum processing be performed by a chip sequence signal generator involving a PN code, RESP. at 20, while Plaintiff asserts that this would limit the patent to a particular modulation technique and the '322 patent discloses that it may be implemented with any spread-spectrum modulation scheme. REPLY at 3–4.

A. Intrinsic Evidence

Looking first to the intrinsic evidence, the patent specification, claims, and prosecution history fail to reconcile this dispute. While the claims and specification of the '322 patent repeatedly refer to "a spread-spectrum communications system," '322 patent at 1:59–60; "spread-spectrum devices," *id.* at 2:14–15; "spread-spectrum subchannel signals," *id.* at 2:21; and "spread-spectrum devices" which "spread-spectrum process" the data, *id.* at 3:25–26, the patent does not disclose what the term "spread-spectrum" means in this context. The prosecution history similarly fails to explain this fundamental principle. As a result, both parties have submitted extrinsic evidence which they contend shows how one of ordinary skill in the art at the time the patent was filed would understand the "spread-spectrum" terms.

Defendant contends that the '322 patent specification and claims together resolve the dilemma, but submits extrinsic evidence to rebut Plaintiff's arguments. Defendant contends that the '322 patent requires that the spread-spectrum processing be performed by a chip sequence signal generator involving a PN code. RESP. at 20. The specification repeatedly refers to chip sequence signals and chip sequence signal generators. *See, e.g.*, '322 patent at 2:16–17, 3:43, 5:17–19, 6:28; *see also id.*, Figs. 1, 2, 4, 5. However, the use of a PN code is only referenced twice in the

specification. *Id.* at 6:28–30 ("The first, second, third and fourth chip-sequence signals . . . typically are pseudonoise (PN) spreading sequences."); *id.* at 7:9–11("A chip-sequence signal typically is generated from a pseudo noise (PN) sequence, as is well known in the art."). It is also worth noting that the asserted claims never refer to a PN code, spreading code, spreading function, or chip sequence signal.

With respect to the PN code, the patent fails to limit itself to the use of a PN code for the disclosed spread-spectrum modulation technique. This specific method of spread-spectrum processing is referenced only twice within the patent, and each time is within the preferred embodiments. The Federal Circuit has directed district courts to focus on the specification and prosecution history during claim construction, while taking care not to read particular embodiments into the claims. *Tate Access*, 222 F.3d at 966 ("[a]lthough claims must be read in light of the specification of which they are part . . . it is improper to read limitations from the written description into a claim"). Because the use of a PN code is not required by the claims and is disclosed only in the preferred embodiments, it would be improper to read this limitation for generating chip sequence signals into the asserted claims.

Moreover, in each of these two references, the specification notes that a chip sequence signal is "typically" generated from a PN sequence, implying that a chip sequence signal may be generated by other techniques. '322 patent at 6:28–30 ("The first, second, third and fourth chip-sequence signals . . . *typically* are pseudonoise (PN) spreading sequences.") (emphasis added); *id.* at 7:9–11("A chip-sequence signal *typically* is generated from a pseudo noise (PN) sequence, as is well known in the art.") (emphasis added). For these reasons, the Court declines to adopt Defendant's proposed construction.

Despite the fact that the specification repeatedly refers to the use of a chip sequence signal as the means for spread-spectrum processing, the Court is not convinced that this is a necessary limitation either. Looking first to the asserted claims, the patent fails to disclose how the transmitted signal is spread across the available bandwidth. Looking to the other claims, claim 61 discloses:

> 61. The method as set forth in claim 25 with the step of detecting the first spread-spectrum signal and the second spread-spectrum signal, including the step of detecting, responsive to a first chip-sequence signal and to a second chip-sequence signal, the first spread-spectrum signal and the second spread-spectrum signal as the first plurality of detected spread-spectrum signals and the second plurality of detected spread-spectrum signals, respectively.

'322 patent at 24:23–30. If the Court were to hold that the spread-spectrum modulation techniques disclosed in the asserted patent necessarily utilized a chip-sequence signal to spread the transmitted signal, this would render claim 61 unnecessary, as it would be identical in scope to claim 25. Noting the importance of both asserted and unasserted claims in properly construing claim terms, the Federal Circuit has noted that "[d]ifferences among claims can also be a useful guide in understanding the meaning of particular claim terms." *Phillips*, 415 F.3d at 1314 (citations omitted). Particularly relevant here, the Federal Circuit has specifically said, "the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim." *Phillips*, 415 F.3d at 1314–15 (citations omitted). Thus, the Court presumes that the chip-sequence signal limitation is not present in independent claim 25.

Furthermore, although the specification repeatedly refers to a chip sequence signal as a means for spread-spectrum modulation, nothing in the intrinsic evidence requires the use of this modulation technique. This modulation technique is disclosed in the preferred embodiment, however nothing in the claims, specification, or prosecution history limit the invention to the use

of a chip sequence signal. To import this limitation from the preferred embodiment would be improper. *Tate Access*, 222 F.3d at 966 (Fed. Cir. 2000) ("[a]lthough claims must be read in light of the specification of which they are part . . . it is improper to read limitations from the written description into a claim"); *Arbitron*, 2009 WL 68875 at *3 ("although the specification may indicate that certain embodiments are preferred, particular embodiments appearing in the specification will not be read into the claims when the claim language is broader than the embodiments").

Having fully reviewed the intrinsic record and taking the parties' agreements into consideration, the Court is left with undisputed examples of spread-spectrum modulation—DS, FH, and TH—but no resources from which to ascertain the scope of a proper construction consistent with the understanding of one skilled in the art. The patentee uses the term "spread-spectrum" repeatedly throughout the specification and claims to describe devices, signals, the system, and a type of processing. *See* '322 patent at 1:59–60; 2:14–15; 2:21; 3:25–26. However the patentee neither explains how one skilled in the art would understand this term, nor explicitly defines this term. *See Johnson Worldwide*, 175 F.3d at 990. The intrinsic evidence fails to disclose what one skilled in the art would understand this term's ordinary and customary meaning to be. *See Phillips*, 415 F.3d at 1313 ("the ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention"). After fully reviewing the intrinsic evidence, the meaning of this disputed term is ambiguous.

B. Extrinsic Evidence

Because the intrinsic evidence fails to disclose the proper scope of the term "spread-spectrum" as used in the '322 patent, the Court will now look to the extrinsic evidence submitted by the parties to ascertain a proper construction. *Vitronics*, 90 F.3d at 1584 (noting that if ambiguities remain after consideration of all available intrinsic evidence, only then should a trial court resort to extrinsic evidence in order to properly construe the claims). Plaintiff submits a tutorial co-written by Dr. Schilling entitled, "Theory of Spread-Spectrum Communications—A Tutorial." OPENING, EXH. C ("Schilling Tutorial"). Because it was published in 1982, this tutorial only provides background information regarding spread-spectrum techniques that existed sixteen years prior to the grandparent application being filed. This tutorial defines spread-spectrum as:

> A means of transmission in which the signal occupies a bandwidth in excess of the minimum necessary to send the information; the band spread is accomplished by means of a code which is independent of the data, and a synchronized reception with the code at the receiver is used for despreading and subsequent data recovery.

Id. at 855. The tutorial also notes the importance of the "means by which the spectrum is spread," before going on to describe how signals are spread in DS, FH, and TH systems.[8] *Id.*

Plaintiff also submits a section from the Code of Federal Regulations entitled, "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations." OPENING, EXH. D ("CFR Regs."); 47 C.F.R. § 2.1 (1996). This section defines many of the terms and principles discussed herein. DS systems are defined as "spread-spectrum system[s] in which the incoming

[8]The tutorial also notes that "to adequately cover the spread-spectrum system completely is the task for an entire text," and given the parties' considerable dispute over the term, the Court finds this conclusion applicable here as well.

information is . . . added to a higher speed code sequence. . . . [which] is the direct cause of the wide spreading of the transmitted signal." *Id.* at 330. FH systems are defined as:

> [S]pread spectrum system[s] in which the carrier is modulated with the coded information . . . causing a conventional spreading of the RF energy about the carrier frequency. . . . [which] changes at fixed intervals under the direction of a pseudorandom coded sequence. . . . [requiring a] wide RF bandwidth . . . to accommodate the range of frequencies to which the carrier frequency can hop.

Id. at 331. Similarly, TH systems are defined as "spread-spectrum system[s] in which the period and duty cycle of a pulsed RF carrier are varied in a pseudorandom manner under the control of a coded sequence." *Id.* at 338. Finally, spread-spectrum systems are defined as "information bearing communications system[s] in which: (1) [i]nformation is conveyed by modulation of a carrier by some conventional means, (2) the bandwidth is deliberately widened by means of a spreading function over that which world be needed to transmit the information alone." *Id.* at 337.

Defendant also submits a number of exhibits that it contends are relevant extrinsic evidence. First, Defendant submits portions of Newton's Telecom Dictionary. RESP., EXH. D ("Telecom Dict."). This dictionary defines spread-spectrum:

> Spread Spectrum . . . is a modulation technique in wireless systems. The data to be transmitted are packetized, and spread over a wider range of bandwidth than demanded by the content of the original information stream. Spread spectrum takes an input signal, mixes it with FM noise, and spreads the signal over a broad frequency range. Spread spectrum receivers recognize a spread signal, acquire and de-spread it and thus return it to its initial form (the original message).

Id. at 672.

Second, Defendant submits two patents listing Dr. Schilling as the inventor. The first patent describes spread-spectrum as providing a "means for communicating in which a spread-spectrum

signal occupies a bandwidth in excess of, or equal to, the minimum bandwidth necessary to send the same information." RESP., EXH. E, U.S. Patent No. 5,081,643 ("the '643 patent") at 1:54–57. Defendant points to the portion of the patent which notes that this spread is "accomplished using a chip-code signal which is independent of an information-data signal." *Id.* at 1:58–59. The second patent notes that a spread signal may be despread by a receiver by "using a product detector with a chipping sequence . . . or a matched filter having an impulse function matched to the chipping sequence of the received spread-spectrum signal." RESP., EXH. F, U.S. Patent No. 5,422,908 ("the '908 patent") at 1:54–60.

Defendant also submits a number of other exhibits which, while probative on the issue of whether OFDM is a spread-spectrum modulation technique, are not probative of how one skilled in the art would understand the term "spread-spectrum" during the relevant time period. Defendant submits a decision from the Federal Communications Commission regarding spread-spectrum devices. RESP., EXH. G ("FCC Decision"). However, this decision is from 2001 and therefore does not assist the Court in determining how one skilled in the art would have understood the term spread-spectrum in 1998 when the patent application was filed.

Defendant also submits two decisions from this District which generally discuss spread-spectrum modulation and OFDM processing. RESP., EXHS. H, I. The decisions are from 2006 and 2008, respectively, and both involve a patent entitled, "Wireless LAN." *See* U.S. Patent No. 5,487,069 ("the '069 patent'). The application for this patent was filed in 1993, and the patent teaches a combination of three techniques for overcoming multipath interference in a wireless networking environment: 1) specific parallel-subchannels; 2) data reliability enhanced by forward error correction; and 3) data reliability enhanced by bit interleaving. *Microsoft Corp. v.*

Commonwealth Scientific and Indus. Research Organisation, 572 F. Supp. 2d 786 (E.D. Tex. 2008). Importantly, the patent does not teach, nor focus on spread-spectrum modulation. In fact, the patent refers to spread-spectrum processing only once to note that the technique "consume[s] too much bandwidth . . . to be effective." '069 patent at 2:6–9. As a result, the discussion of spread-spectrum in Defendant's Exhibits H and I were not only unnecessary to the holdings—dicta—but were included merely as general background to the patents-in-suit. Therefore, this extrinsic evidence does not assist the Court in determining a proper construction for the "spread- spectrum" terms.

The extended time period from which the parties' extrinsic evidence was produced is further evidence that the term "spread-spectrum" was well-known in the art at the time the patent application was filed. One of ordinary skill in the art would have attributed meaning to this term, and the repeated and differing uses of the term within the specification and claims of the '322 patent support this conclusion. As a result, the Court will next move to framing a construction which embodies the ordinary and customary meaning of this term.

C. Means for Modulating a Spread-Spectrum Signal

As a result, it is clear and undisputed that DS, FH, and TH are all spread-spectrum modulation techniques. What remains in dispute is whether this Court's construction of the "spread-spectrum" terms should include a limitation regarding the means for modulation and, if so, how that means should be defined. The intrinsic evidence denotes a chip sequence signal for modulating the signal, but as previously noted, the patent is not so limited. The extrinsic evidence denotes multiple modulation means: 1) a code, SCHILLING TUTORIAL at 855; 2) a high speed spreading code (DS), CFR REGS. at 330; 3) a PN coded sequence causing spreading about changing carrier frequencies (FH), *id.* at 331; 4) a coded sequence which varies the period and duty cycle of the signal carrier in

a PN manner (TH), *id.* at 338; 5) a spreading function, *id.* at 337; 6) a chip code signal, '643 at 1:58–59; and 6) a chipping sequence, '908 at 1:54–60.

While Plaintiff argues that a proper construction does not require a limitation as to the means of modulation for the spread-spectrum terms, such a construction—as proposed by Plaintiff—would be improperly broad. Plaintiff's proposed construction defines spread-spectrum by the function resulting from the modulation, but fails to limit the term to any means for modulation. Both the intrinsic and extrinsic evidence discuss and define spread-spectrum systems in terms of the means of modulation. With only one exception, each of the exhibits surveyed above defines spread-spectrum by its means for modulation. SCHILLING TUTORIAL at 855 ("the band spread is accomplished by means of a code with is independent of the data"); CFR REGS. at 337 ("the bandwidth is deliberately widened by means of a spreading function"); '643 patent at 1:58–59 (spreading is "accomplished using a chip-code signal which is independent of an information-data signal"); '908 patent at 1:54–60 (despreading occurs by "using a product detector with a chipping sequence . . . or a matched filter having an impulse function matched to the chipping sequence").[9] Further, the importance of the means for modulation is highlighted by the '322 patent's repeated references to chip sequence signals and chip sequence signal generators. *See, e.g.*, '322 patent at 2:16–17, 3:43, 5:17–19, 6:28; *see also id.*, Figs. 1, 2, 4, 5. Merely defining this term by the result of the modulation is insufficient, and as a result, the Court finds that it is necessary to define the

[9]Newton's Telecom Dictionary is the only exhibit which does not explicitly define spread-spectrum in terms of the means for modulation. Instead, this exhibit notes that, "[s]pread spectrum takes an input signal, mixes it with FM noise, and spreads the signal over a broad frequency range." TELECOM DICT. at 672. However, even the FCC Decision submitted by Defendant, which was not discussed in detail previously, defines spread-spectrum in terms of the means for modulation, further supporting this Court's conclusion. *See* FCC DECISION at 7 ("the bandwidth is deliberately widened by means of a spreading function").

"spread-spectrum" terms by the signal spreading means. *See, e.g.*,SCHILLING TUTORIAL at 855 ("The means by which the spectrum is spread is crucial.").

Therefore, the Court finds that a spread-spectrum system is a wireless communications system in which data to be transmitted is processed with one or more codes to generate a signal which is distributed across the available bandwidth. Incorporating that definition, the term "spread-spectrum subchannel signals" is properly construed as "signals, corresponding to each of the subchannels of data, which have been processed with one or more codes that distributes each signal across the available bandwidth."

II. "with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum subchannel signals, respectively"[10]

Plaintiff's Proposed Construction	**Defendant's Proposed Construction**
with the plurality of subchannels of data processed using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	with each subchannel of data processed with a different pseudonoise (PN) chip-sequence signal to generate a spread-spectrum subchannel signal

Here, Plaintiff and Defendant present the same arguments as noted in the previous section. For all the reasons discussed in the previous section, the Court rejects both parties' proposed constructions for this term. As with the previous term, Plaintiff's construction is improperly broad, while Defendant's construction is too narrow. Therefore, incorporating the discussion in section I, *supra*, the term "with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum subchannel signals, respectively" is properly construed as "with the plurality of

[10]The term "with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum subchannel signals, respectively" is contained in claims 1 and 9.

subchannels of data processed with one or more codes generating a plurality of subchannel signals which are each distributed across the available bandwidth."

III. "spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum subchannel signals, respectively"[11]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
processing a plurality of subchannels of data using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	processing each subchannel of data with a different pseudonoise (PN) chip-sequence signal to generate a spread-spectrum subchannel signal.

As with the previous disputed claim term, Plaintiff and Defendant again present the same arguments as noted in the previous sections. For all the reasons discussed in sections I and II, *supra*, the Court rejects both parties' proposed constructions for this term. As with the previous term, Plaintiff's construction is improperly broad, while Defendant's construction is too narrow. Therefore, incorporating the foregoing discussion from sections I and II, the term "spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum subchannel signals, respectively" is properly construed as "processing the plurality of subchannels of data with one or more codes that distributes each signal across the available bandwidth, thereby generating a plurality of spread-spectrum subchannel signals which correspond to each of the subchannels of data."

[11]The term "spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum subchannel signals, respectively" is contained in claims 25 and 33.

IV. "plurality of spread-spectrum signals"[12]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
plurality of signals processed using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	a plurality of signals that have a spread-spectrum subchannel defined by different pseudonoise (PN) chip-sequence signals.

As with the previous disputed claim terms, Plaintiff and Defendant again present the same arguments as noted in the previous sections. For all the reasons discussed in sections I, II, and III, *supra*, the Court rejects both parties' proposed constructions for this term. As with the previous term, Plaintiff's construction is improperly broad, while Defendant's construction is too narrow. Therefore incorporating the foregoing discussion in sections I, II, and III, the term "plurality of spread-spectrum signals" is properly construed as "plurality of signals processed with one or more codes that distributes each signal across the available bandwidth."

[12]The term "plurality of spread-spectrum signals" is contained in claims 1, 9, 25, and 33.

V. "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively"[13]

Plaintiff's Proposed Construction	**Defendant's Proposed Construction**
"first spread-spectrum signal:" Other than construing the term "spread spectrum," which means "a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data," Linex does not believe that a construction of this phrase is necessary.	The phrase "first spread-spectrum signal" means "the spread spectrum subchannel signal radiated from a first antenna."
"second spread-spectrum signal:" Other than construing the term "spread spectrum," which means "a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data," Linex does not believe that a construction of this phrase is necessary.	The phrase "second spread-spectrum signal" means "the spread spectrum subchannel signal radiated from a second antenna."

[13]The term "detecting at each receiver antenna of the plurality of receiver antennas . . ." is contained in claims 1, 9, 25, 33.

"process of determining the presence of, and recovering the multipath spread spectrum signals received at each antenna port"	The phrase "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal . . . as a first plurality of detected spread-spectrum signals" means "[that each receiver antenna receives all of the transmitted spread spectrum signals and that the receiver] match[es]ing the signals received at each receiver antenna with the pseudonoise (PN) chip sequence signal of the first spread-spectrum signal to identify the plurality of multipath signals corresponding to the first spread spectrum signal." The phrase "detecting, at each receiver antenna of the plurality of receiver antennas, . . . the second spread-spectrum signal, as a . . . second plurality of detected spread-spectrum signals" means [that each receiver antenna receives all of the transmitted spread spectrum signals and that the receiver]1 match[es]ing the signals received at each receiver antenna with the pseudonoise (PN) chip sequence signal of the second spread-spectrum signal to identify the plurality of multipath signals corresponding to the second spread spectrum signal." The multipath signals include time multipath signals, namely signals received as a result of different time delays caused by multiple paths.

Plaintiff argues that Defendant's construction is "intended to limit the scope of the claims to direct sequence spread-spectrum systems that employ pseudo-noise chip sequence signals to spread the data streams before transmission," yet "[t]he plain language of the asserted claims is not limited to any particular type of spread spectrum system." OPENING at 16.

Defendant responds that Plaintiff's construction fails to take into account the expressly recited language requiring the detection at each antenna of two separate spread-spectrum signals.

RESP. at 25. Defendant contends that the claim language requires detection of two signals in the same antenna, while Plaintiff's proposed construction would cover detection of the two signals at different antennas. *Id.*

The parties' respective constructions both acknowledge that "multipath" signals are received by the receiver antennas. The parties main dispute centers on how many of the multipath signals are detected or received at each antenna port. Plaintiff asserts that according to the language of claim 1, each receiver antenna detects only a first and second signal. Defendant asserts that each antenna receiver will detect a first and second signal, in addition to all multipath versions of these two signals. Thus, Defendant argues that the Court should read space and time diversity limitations into this term.

This dispute is substantially resolved by looking to the language of each asserted claim. The asserted claims disclose that at least two spread-spectrum signals are generated. '322 patent at 14:17–22 (claim 1); 15:49–54 (claim 9); 18:56–61 (claim 25); 20:27–32 (claim 33).[14] The asserted claims also disclose that each receiver antenna detects a first and second signal. '322 patent at 14:26–28 (claim 1); 15:59–62 (claim 9); 18:66–67, 19:1 (claim 25); 20:36–39 (claim 33). Thus, the claims disclose that while at least two signals are generated, only a first and second signal must be received and detected by each receiver antenna within the plurality of receiver antennas. Because Defendant's proposed construction requires that all signals be received by each receiver antenna, the Court rejects Defendant's proposed construction. Moreover, Defendant's proposed construction includes a limitation that the receiver match the signal with the "pseudonoise

[14]This language is disclosed in the preamble of claims 1 and 9, but is within the limitations of claims 25 and 33. The Court notes the distinction, without expressing an opinion regarding what effect this may have.

(PN) chip sequence signal." Having determined that this is an improper limitation, *see* section II(A), *supra*, this limitation is a second basis for rejecting Defendant's proposed construction.

While space and time diversity are key elements of the asserted patent—as will be discussed further in section VI, *infra*—these are not limitations that should be explicitly read into this disputed term, aside from acknowledging that "multipath" signals are detected. The parties' respective constructions both acknowledge that "multipath" signals are received by the receiver antennas, and the parties agree that this term refers to the multiple copies of the same signal that a receiver antenna may receive. OPENING at 2 (the transmitted signals "bounce off of obstacles . . . [causing] the receiving antenna [to] receive multiple copies of the same signal, but at different times. . . . [t]hese copies are referred to as the multipath signals"); RESP. at 25 ("multipath signals include time multipath signals, namely signals received as a result of different time delays caused by multiple paths").

Plaintiff's construction properly acknowledges that this claim term refers to the process of determining the presence of and recovering the multipath signals received at each antenna port. However, because the claims each explicitly require that both a first and second multipath spread-spectrum signal are received by each antenna, this is a necessary limitation that should be included in the construction.

Therefore, the term "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively" is properly construed as "process of determining the presence of and recovering both

the first spread-spectrum signal and second spread-spectrum signal received at each antenna port, with the first spread-spectrum signal and second spread-spectrum signal being multipath signals."

VI. "combining"[15]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
forming a single aggregated version of the received signal from the multiple versions of the transmitted signal received at the multiple receiver antennas	signals are combined using space diversity and time diversity employing multiple combiners and rakes

Plaintiff argues that the patent specification clearly discloses that any appropriate method known in the art may be used to combine the received signals. OPENING at 17–18. Plaintiff contends, therefore, that Defendant's proposed construction improperly limits this term to the preferred embodiment by requiring combining to include both time and space diversity components. *Id.* Further, Plaintiff objects to Defendant's proposed constructions for phrases which were not previously disclosed as being subject to dispute. REPLY at 7.

Defendant argues that space and time diversity are required elements of this term not only because the specification discloses these two required elements, but also because Plaintiff specifically distinguished two prior art references—Higashi and Ono—on this basis. RESP. at 27. Defendant also argues that Plaintiff's proposed construction is unduly broad because it fails to take into account that the first and second plurality of detected spread-spectrum subchannel signals must be combined from each receiver antenna. *Id.*

[15]The term "combining . . . " is contained in claims 1, 9, 25, and 33. Additionally, Defendant asks the Court to construe the phrase, "combining, from each receiver antenna of the plurality of receiver antennas, each of the first plurality of detected spread-spectrum signals, thereby generating a first combined signal; and combining, from each receiver antenna of the plurality of receiver antennas, each of the second plurality of detected spread-spectrum signals, thereby generating a second combined signal." RESP. at 26–28. Yet Defendant arguments relate to a proper construction of the term "combining." *Id.* Therefore, the Court declines to construe the "combining . . ." phrase proposed by Defendant, in favor of construing the disputed term.

The patent discloses that the received signals are combined using space and time diversity. First, the claims explicitly acknowledge that the signals are transmitted in a multipath environment. '322 patent at 14:15–22 (claim 1); 15:47–54 (claim 9); 18:55–61 (claim 25); 20:26–32 (claim 33).[16] Second, every combiner contained within the figures is labeled a "RAKE and space combiner." *Id.*, Figs. 3, 6, 7. Third, the specification consistently refers to RAKE and space-combiners. *See, e.g., id.* at 2:53–58; 3:49–52; 4:38–41; 4:66–67, 5:1–4; 6:1–6; 9:42–67; 10:1–67; 11:33–38. Further, the "Detailed Description fo the Preferred Embodiments" section notes:

> *The present invention provides a novel approach for reducing the effect of fading due to shadowing and multipath, through the use of multiple antennas at the terminal and also at the base station, as well as a single RAKE /maximal ratio combiner to combine all time and space signals.* Previous solutions have assumed multiple antennas at the base, where space diversity is then applied. Also, each antenna receiver has an individual RAKE. Placing multiple antennas at the terminal, however, can result in a significant improvement in system performance. The use of maximal ratio combining, RAKE and erasure decoding further enhance system performance.

Id. at 4:26–37 (emphasis added). In fact, every time the patent refers to a "combiner" or a "combining" function, the patent also refers to RAKE and space or time and space diversity combiners. *See, e.g., id.* at 2:53–58("[a] plurality of RAKE and space-diversity combiners combine the plurality of detected spread-spectrum signals "); 3:49–52 ("[a] RAKE and space-diversity combiner combines the detected spread-spectrum signal"); 4:38–41 ("the present invention broadly includes an antenna system employing time (RAKE) and space (antenna) diversity and coding of

[16]The Court acknowledges that claims 1 and 9 only use the term "multipath" within the preamble to each respective claim. The Court further recognizes that as a result this term may or may not be a limitation on the claims. *See Symantec Corp. v. Computer Associates Int'l, Inc.*, 522 F.3d 1279, 1288 (Fed. Cir. 2008) ("Because the disputed term appears in the preamble to claim 1, we must first determine whether it is in fact a separate limitation."). However, the Court declines to address the issue, as the dispute is adequately resolved on other grounds, as discussed below.

spread spectrum signals"); 4:66–67, 5:1–4 ("[t]he RAKE and space-diversity means is coupled to each matched filter means of the plurality of receiver subsystems"); 6:1–6 ("[t]he RAKE and space-diversity means combines the plurality of detected spread-spectrum signals"); 9:42–67 ("[t]he plurality of RAKE and space-diversity combiners combines each plurality of detected spread-spectrum signals"); 10:1–67 ("[a] second RAKE and space-diversity combiner 162 is coupled to the [filters]"); 11:33–38 ("[t]he plurality of RAKE and space-diversity combiners 161, 162, 163, 164 combine the plurality of detected spread spectrum signals").

Fourth, the specification also explicitly notes the importance of the order of combining, depending on the data sent by each transmitter. *Id.* at 11:60–63 (noting that the order of combining is important if each transmitter antenna sends different data, but not if each transmitter antenna sends the same data); 12:26–41 (noting that when the same data is transmitted over each antenna, any order of combining yields the same result and all combining from all receiver antennas can be done simultaneously—time and space diversity).

Here, the patent claims and specification emphasize time and space combining as a key feature in the patented invention. Moreover, the prosecution history also supports this conclusion. As Defendant argues, Plaintiff distinguished its invention over the prior art by arguing that the invention disclosed the use of both space and time diversity. RESP. at 27. In a final amendment before the '322 patent was allowed, Plaintiff represented to the Patent Office that:

> The present invention has the advantage of providing space diversity and time diversity, using a plurality of antennas and a plurality of spread-spectrum signals.
>
> Ono does not teach or suggest a system, having space diversity and time diversity, for receiving data which were demultiplexed, spread-spectrum processed and then sent over the communications channel having multipath.

RESP., EXH. C at 188–89. Ono is entitled and teaches a Rake Reception Method For a Spread Spectrum Signal. U.S. Patent No. 5,999,560 ("the '560 patent").

This representation is pertinent to the issue of claim construction because "[t]he prosecution history gives insight into what the applicant originally claimed as the invention, and often what the applicant gave up in order to meet the Examiner's objections." *Lemelson v. Gen. Mills, Inc.*, 968 F.2d 1202, 1206 (Fed. Cir. 1992). Further, the prosecution history is important where there is particular prior art that the patentee was trying to distinguish. *Id.* Referring to the prosecution history in this way for the purposes of claim construction ensures that the claims are construed during litigation consistently with the intended scope as allowed by the Patent Office. *Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005). Thus, the doctrine of prosecution history disclaimer applies, narrowing the ordinary meaning of the claim consistent with the disclaimer, when a "patentee has unequivocally disavowed a certain meaning to obtain his patent." *Id.* (quoting *Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003)).

Not only do the claims and specification disclose that both space and time-diversity combining are required limitations, but Plaintiff also made an affirmative representation to the Patent Office during prosecution which limited the claimed invention to this embodiment. Plaintiff disclaimed methods which failed to include both space and time-diversity combining. Plaintiff now seeks a construction for the "combining" term that would expand the claim scope beyond that which was represented to the Patent Office. Plaintiff proposes that "combining" should be construed as "forming a single aggregated version of the received signal from the multiple versions of the transmitted signal received at the multiple receiver antennas." OPENING at 17–18. This construction plainly and adequately describes what is taking place when signals are combined. However, because

the intrinsic evidence supports the conclusion that this construction fails to include the required limitations of both time and space combining, Plaintiff's proposed construction is too broad.

Plaintiff argues that the patent discloses that it is not limited to combining that includes both space and time diverse signals and that "the '322 patent clearly discloses that any appropriate method known in the art may be used to combine the received signals." OPENING at 17–18. In support of this argument, Plaintiff points to the following portion of the specification:

> The first RAKE and space-diversity combiner 161 may use any of a number of techniques for combining signals, such as selecting the four strongest signals and adding their strengths, maximal ratio combining, maximal likelihood combining, etc. RAKE and combining techniques are well known in the art.

'322 patent at 9:62–67.[17] However, this portion of the specification does not support Plaintiff's argument. It merely notes that differing time and space-diversity combining techniques are well known in the art and may be used. It does not state that both of these techniques are not required limitations of the claimed invention. In other words, the claimed invention requires both the ability to combine both time and space-diverse signals, but the methods used to combine these signals is left up to the designer.

Defendant's proposed construction is also flawed because it fails to describe what is actually taking place when the signals are being combined. A construction which defines the term "combining" as "signals are combined using space diversity and time diversity employing multiple combiners and rakes" requires time and space-diversity combining, but fails to explain what that means or what is taking place when the received signals are combined. Thus, the Court rejects Defendant's proposed construction. For all the foregoing reasons, the term "combining" is properly

[17]This statement is repeated three more times throughout the patent. *See* '322 patent at 10:14–19, 33–38, 52–57.

construed as "forming a single aggregated version of the received signal from the multiple versions of the transmitted time and space diverse signals received at the multiple receiver antennas."

VII. "multiple input multiple output" or "MIMO"[18]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
a communication system in which the data to be transmitted is first demultiplexed so that different distinct parts of the data are each modulated and input to different transmit antennae; and in the receiver, the different distinct parts of the data received by the plurality of receive antennae must be combined to form an estimate of the transmitted data	multiple signals input into the communications channel and multiple outputs from the communications channel

At the hearing, the parties agreed to a construction of the previously disputed term "multiple input multiple output." The term "multiple input multiple output" or "MIMO" is properly construed as "multiple signals input by multiple antennas into the communications channel and multiple outputs from the communication channel that are received at multiple antennas."

[18]The term "multiple input multiple output" or "MIMO" is contained in claims 25 and 33.

VIII. "demultiplexer . . .," "demultiplexing . . .," and "demultiplexed . . ."

"demultiplexing the data into a plurality of subchannels of data"[19]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
process of taking an incoming data stream and dividing it into distinct output streams	dividing a stream of interleaved data into two or more sub-data streams

"data having symbols demultiplexed into a plurality of subchannels of data"[20]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
"demultiplexed" means "an incoming data stream that has been divided into distinct output streams"	a stream of interleaved data divided into two or more sub-data streams

"demultiplexer for demultiplexing the data into a plurality of subchannels of data"[21]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
a device that takes an incoming data stream and divides it into distinct output streams	a device for dividing a stream of interleaved data into two or more sub-data streams

At the hearing, the parties agreed to a construction of the term "demultiplexing." Therefore, the term "demultiplexing" is properly construed as "process of taking an incoming data stream and dividing it into output streams that are distinct from each other and distinct from the incoming data stream."

[19]The term "process of taking an incoming data stream and dividing it into distinct output streams" is contained in claims 25 and 33.

[20]The term "data having symbols demultiplexed into a plurality of subchannels of data" is contained in claims 1 and 9.

[21]The term "demultiplexer for demultiplexing the data into a plurality of subchannels of data"is contained in claim 33.

IX. "a plurality of spread-spectrum devices for spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals, respectively"[22]

Plaintiff's Proposed Construction	Defendant's Proposed Construction
"a plurality of devices that process signals using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data." Linex does not believe that the construction of this phrase should be governed by 35 U.S.C. § 112(6).	This phrase is a means plus function claim element. The corresponding structure that performs the function of "spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals" is a plurality of multiplication circuits or exclusive-or gates that multiply a plurality of subchannels of data by a plurality of pseudonoise (PN) chip-sequence signals, respectively.

Plaintiff argues that although Linex's prosecution counsel specifically noted during prosecution of the '322 patent that claim 33 uses means-plus-function claim language, this statement was incorrect and a mere mistake. REPLY at 9. Plaintiff asserts that no less than thirty-one of the claims of the '322 patent are written in traditional means-plus-function format, specifically using the word "means," and claims 9 and 33 are not, indicating they were not intended to be construed as means-plus-function claims. *Id.* at 9–10.

Defendant responds that Linex specifically advised the patent examiner during prosecution that "claims 33 and 41 employ means plus function, as elements in the claims," and therefore Linex should be held to this representation. RESP. at 29. Defendant also argues that this claim limitation is defined in terms of a function, and therefore it is appropriate to construe this claim limitation as being in means-plus-function format. RESP. at 30. In support of this argument,

[22]The term "a plurality of spread-spectrum devices for spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals, respectively" is contained in claim 33.

Defendant cites to two Federal Circuit cases which construe claim limitations lacking the word "means" to be in means-plus-function format. *Mas-Hamilton Group v. LaGard, Inc.*, 156 F.3d 1206, 1214 (Fed. Cir. 1998); *Welker Bearing Co. v. PHD, Inc.*, 550 F.3d 1091, 1095–96 (Fed. Cir. 2008).

In the Request for Reconsideration after a denial of a Certificate of Correction filed with the Patent Office after the '322 patent originally issued, Linex's prosecution counsel noted that "claims 33 and 41 employ means plus function, as elements in the claims." RESP., EXH. C at 219. This statement indicates that claim 33 is in means-plus-function format. Both parties recognize that claim 33 does not recite the word "means," while a number of other claims contained in the '322 patent do. REPLY at 10; RESP. at 29–30. Yet, the Court cannot simply ignore the remainder of the file history, specification, and claim set.

A rebuttable presumption thus arises that this limitation is not in means-plus-function format because "the use of the term 'means' has come to be so closely associated with 'means-plus-function' claiming that it is fair to say that the use of the term 'means' . . . generally invokes section 112(6) and that the use of a different formulation generally does not." *Greenberg v. Ethicon Endo-Surgery, Inc.*, 91 F.3d 1580, 1584 (Fed. Cir. 1996). This presumption "can be rebutted if the evidence intrinsic to the patent and any relevant extrinsic evidence so warrant. . . . [though] the focus remains on whether the claim as properly construed recites sufficiently definite structure to avoid the ambit of § 112, ¶ 6." *Personalized Media Commc'ns, LLC v. Int'l Trade Comm'n*, 161 F.3d 696, 704 (Fed. Cir. 1998) (internal citations omitted).

Here, because claim 33 does not use the word "means," a rebuttable presumption that it is not in means-plus-function format arises. Defendant must overcome this presumption before the Court will construe the term as a means-plus-function limitation. Defendant attempts to do so by

pointing to the statement regarding claim 33 in the prosecution history. As previously noted, "[t]he prosecution history gives insight into what the applicant originally claimed as the invention, and often what the applicant gave up in order to meet the Examiner's objections." *Lemelson*, 968 F.2d at 1206. Thus, the doctrine of prosecution history disclaimer applies, narrowing the ordinary meaning of the claim consistent with the disclaimer, when a "patentee has unequivocally disavowed a certain meaning to obtain his patent." *Chimie*, 402 F.3d at 1384.

While an affirmative assertion that a claim limitation is in means-plus-function format would operate as a disavowal of claim scope, *see Johnston v. IVAC Corp.*, 885 F.2d 1574, 1580 (Fed. Cir. 1989), Plaintiff asserts that this assertion was a mere error. REPLY at 9. Plaintiff argues that "the statement made by prosecution counsel was incorrect and mistakenly placed claim 33 in the same means-plus-function category as claim 41, which is clearly written in means-plus-function format." *Id.* Plaintiff points to thirty-one of the other claims in the '322 patent which use the word "means" to support its argument that Linex's prosecution counsel did not intend claim 33 to be in means-plus-function format and to support its argument that the assertion that it is was a mere mistake. *Id.*

The Federal Circuit faced a similar situation in *C.R. Bard, Inc. v. United States Surgical, Corp.* 388 F.3d 858 (Fed. Cir. 2004). In reviewing the prosecution history of the asserted patent, the Federal Circuit noted that the Patent Office initially rejected two of the claims, suggesting that they would be allowed if means-plus-function language were added. *Id.* at 869. The patentee responded that "[i]n accordance with the Examiner's suggestion, claims 19 and 20 have been amended to clearly distinguish [the prior art]," and the examiner subsequently allowed both claims, describing them as means-plus-function. *Id.* However, the patentee failed to add the means-plus-

function language to claim 20. *Id*. Thus, claim 20 was allowed based on the understanding that it was in means-plus-function format, despite the fact that it failed to use the "means" language. *Id.* The Federal Circuit noted:

> It is unclear what import, if any, to draw from Bard's failure to follow the examiner's suggestion for claim 20 as it did for claim 19. Although [plaintiff] did not add . . . explicit means-plus-function language to claim 20, they did adopt language substantially identical to the language suggested by the examiner.

Id. Similarly here, a correction to claim 33 was allowed based on the understanding that claim 33 was in means-plus-function format, despite the fact that—unlike claim 41— it failed to use the word "means." As Defendant argues, claim 33 was drafted in language that could be considered functional. It discloses "a plurality of despreading devices for detecting" the first and second spread-spectrum signals. '322 patent at 20:36–40. As long as "a plurality" of despreading devices" is not sufficient structure to take the limitation outside the realm of section 112, paragraph 6, it could be construed as a means for detecting the first and second spread-spectrum signals.

Given the competing doctrines at issue—prosecution history disclaimer and the rebuttable presumption that the limitation is not in means-plus-function format—the Court finds that, like *C.R. Bard*, it is unclear what import, if any, to affix to Linex's prosecution counsel's statement that claim 33 is in means-plus-function format. While in isolation the statement indicates that claim 33 is in means-plus-function format, as Plaintiff points out there is evidence that this may have been a mere mistake. Specifically, the term "means" is used in claim 41, but not in claim 33. Further, absent this single statement in the Request for Reconsideration asserted to be a mistake, there is no evidence to suggest that the claim limitation was intended to be in means-plus-function format. In other words, the patent issued after a thorough prosecution without any indication that

the limitation was in means-plus-function format. This single indication that claim 33 is in means-plus-function format arose only when Linex's prosecution counsel filed a Request for Reconsideration of a denial of a Certificate of Correction. As previously noted, the Court cannot simply ignore the remainder of the file history, specification, and claim set, none of which include any indication that claim 33 was intended to be in means-plus-function format. Given the entirety of the evidence, it seems highly likely that the statement that claim 33 was in means-plus-function format was a mere mistake. As such, the Court cannot say that this was a clear disavowal, and the presumption that the claim term is not in means-plus-function format has not been rebutted.[23]

Therefore, the Court finds no justification for construing this claim term as being in means-plus-function format. The term "a plurality of spread-spectrum devices for spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals, respectively" is therefore properly construed as "a plurality of devices for processing the plurality of subchannels of data with one or more codes that distributes the signal across the available bandwidth, thereby generating a plurality of signals which correspond to each of the subchannels of data."

[23]Defendant's citations to *Mas-Hamilton Group v. LaGard, Inc.*, 156 F.3d 1206, 1214 (Fed. Cir. 1998), and *Welker Bearing Co. v. PHD, Inc.*, 550 F.3d 1091, 1095–96 (Fed. Cir. 2008), have no bearing on this conclusion. Defendant cites both cases merely for the proposition that it can be appropriate to interpret a claim limitation as means-plus-function when a structure is defined in terms of its function. *See* RESP. at 29–30.

X. "a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively"[24]

Plaintiff's Proposed Construction	**Defendant's Proposed Construction**
The phrase "despreading device" means "a device in the receiver that reverses the spreading operation that occurred in the transmitter." The phrase "detecting, at each receiver antenna of the plurality of receiver antennas" means "process of determining the presence of, and recovering the multipath spread spectrum signals received at each antenna port." Linex does not believe that the construction of this phrase should be governed by 35 U.S.C. § 112(6).	This phrase is a means plus function claim element. The corresponding structure that performs the function of "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal" is a plurality of matched filters matched to the plurality of pseudonoise (PN) chip sequences.

Plaintiff notes that in the preferred embodiment, the matched filters detect the presence of the transmitted spread-spectrum signals and despread the signals. OPENING at 22. However, Plaintiff argues that the design implementation for the detector is not so limited. *Id.* Plaintiff also argues that Defendant attempts to import a means-plus-function analysis from claim 33 to claim 9, based solely on a mistaken representation by Linex's prosecution counsel. REPLY at 10. Further, Plaintiff and Defendant both present the same arguments discussed in the previous section.

As previously noted, Linex's prosecution counsel explicitly noted that "claims 33 and 41 employ means plus function, as elements in the claims." RESP., EXH. C at 219. Based on this

[24]The term "a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively" is contained in claims 9 and 33.

representation, Defendant argues that claims 9 and 33 both include a means-plus-function claim limitation because they both recite the "plurality of despreading devices . . ." term. Having previously concluded that claim 33 is not in means-plus-function format, Defendant's attempt to extend this argument to claim 9 is also rejected. Therefore, for all the same reasons set forth in section IX, *supra*, the Court finds no justification for construing this term as being in means-plus-function format. Therefore, the term "a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively" is properly construed as "a plurality of devices in the receiver that reverses the spreading operation that occurred in the transmitter for determining the presence of and recovering both the first multipath spread-spectrum signal and second multipath spread-spectrum signal received at each antenna port."

CONCLUSION

For all the foregoing reasons, the Court construes the disputed claim language in this case in the manner set forth above. For the ease of reference, the Court's claim interpretations are set forth in a table attached to this opinion as Appendix A.

So ORDERED and SIGNED this 12th day of February, 2009.

JOHN D. LOVE
UNITED STATES MAGISTRATE JUDGE

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION

LINEX TECHNOLOGIES, INC.,	§	
	§	
Plaintiff,	§	
	§	
v.	§	**CIVIL ACTION No. 2:07cv222**
	§	
BELKIN INTERNATIONAL, INC., et al.,	§	
	§	
	§	
Defendants.	§	

APPENDIX A

U.S. PATENT NO. 6,757,322

Claim Language	Claim Number	Plaintiff's Proposed Construction	Defendant's Proposed Construction	Court's Construction
spread-spectrum subchannel signals	1, 9, 25, 33	subchannel signals processed using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	signals, each corresponding to a different one of the subchannels of data, and each having been processed with a different pseudonoise (PN) chip-sequence signal	signals, corresponding to each of the subchannels of data, which have been processed with one or more codes that distributes each signal across the available bandwidth
with the plurality of subchannels of data spread-spectrum processed as a plurality of spread-spectrum subchannel signals, respectively	1, 9	with the plurality of subchannels of data processed using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	with each subchannel of data processed with a different pseudonoise (PN) chip-sequence signal to generate a spread-spectrum subchannel signal	with the plurality of subchannels of data processed with one or more codes generating a plurality of subchannel signals which are each distributed across the available bandwidth
spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum subchannel signals, respectively	25, 33	processing a plurality of subchannels of data using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	processing each subchannel of data with a different pseudonoise (PN) chip-sequence signal to generate a spread-spectrum subchannel signal.	processing the plurality of subchannels of data with one or more codes that distributes each signal across the available bandwidth, thereby generating a plurality of spread-spectrum subchannel signals which correspond to each of the subchannels of data

plurality of spread-spectrum signals	1, 9, 25, 33	plurality of signals processed using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data	a plurality of signals that have a spread-spectrum subchannel defined by different pseudonoise (PN) chip-sequence signals.	plurality of signals processed with one or more codes that distributes each signal across the available bandwidth
detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively	1, 9, 25, 33	"first spread-spectrum signal:" Other than construing the term "spread spectrum," which means "a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data," Linex does not believe that a construction of this phrase is necessary.	The phrase "first spread-spectrum signal" means "the spread spectrum subchannel signal radiated from a first antenna."	process of determining the presence of and recovering both the first spread-spectrum signal and second spread-spectrum signal received at each antenna port, with the first spread-spectrum signal and second spread-spectrum signal being multipath signals
		"second spread-spectrum signal:" Other than construing the term "spread spectrum," which means "a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data," Linex does not believe that a construction of this phrase is necessary.	The phrase "second spread-spectrum signal" means "the spread spectrum subchannel signal radiated from a second antenna."	

		"process of determining the presence of, and recovering the multipath spread spectrum signals received at each antenna port"	The phrase "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal . . . as a first plurality of detected spread-spectrum signals" means "[that each receiver antenna receives all of the transmitted spread spectrum signals and that the receiver] match[es]ing the signals received at each receiver antenna with the pseudonoise (PN) chip sequence signal of the first spread-spectrum signal to identify the plurality of multipath signals corresponding to the first spread spectrum signal." The phrase "detecting, at each receiver antenna of the plurality of receiver antennas, . . . the second spread-spectrum signal, as a . . . second plurality of detected spread-spectrum signals" means [that each receiver antenna receives all of the transmitted spread spectrum signals and that the receiver]1 match[es]ing the signals received at each receiver antenna with the pseudonoise (PN) chip sequence signal of the second spread-spectrum signal to identify the plurality of multipath signals corresponding to the second spread spectrum signal." The multipath signals include time multipath signals, namely signals received as a result of different time delays caused by multiple paths.	

combining	1, 9, 25, 33	forming a single aggregated version of the received signal from the multiple versions of the transmitted signal received at the multiple receiver antennas	signals are combined using space diversity and time diversity employing multiple combiners and rakes	forming a single aggregated version of the received signal from the multiple versions of the transmitted time and space diverse signals received at the multiple receiver antennas
multiple input multiple output or (MIMO)	25, 33	a communication system in which the data to be transmitted is first demultiplexed so that different distinct parts of the data are each modulated and input to different transmit antennae; and in the receiver, the different distinct parts of the data received by the plurality of receive antennae must be combined to form an estimate of the transmitted data	multiple signals input into the communications channel and multiple outputs from the communications channel	multiple signals input by multiple antennas into the communications channel and multiple outputs from the communication channel that are received at multiple antennas
demultiplexing the data into a plurality of subchannels of data	25, 33	process of taking an incoming data stream and dividing it into distinct output streams	dividing a stream of interleaved data into two or more sub-data streams	"demultiplexing" is "process of taking an incoming data stream and dividing it into output streams that are distinct from each other and distinct from the incoming data stream."
data having symbols demultiplexed into a plurality of subchannels of data	1, 9	"demultiplexed" means "an incoming data stream that has been divided into distinct output streams"	a stream of interleaved data divided into two or more sub-data streams	"demultiplexing" is "process of taking an incoming data stream and dividing it into output streams that are distinct from each other and distinct from the incoming data stream."

demultiplexer for demultiplexing the data into a plurality of subchannels of data	33	a device that takes an incoming data stream and divides it into distinct output streams	a device for dividing a stream of interleaved data into two or more sub-data streams	"demultiplexing" is "process of taking an incoming data stream and dividing it into output streams that are distinct from each other and distinct from the incoming data stream."
a plurality of spread-spectrum devices for spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum subchannel signals, respectively	33	"a plurality of devices that process signals using a form of communication in which the signal energy of the data is distributed across the allowed spectrum, where that spectrum is typically greater than or equal to the bandwidth required to carry the data." Linex does not believe that the construction of this phrase should be governed by 35 U.S.C. § 112(6).	This phrase is a means plus function claim element. The corresponding structure that performs the function of "spread-spectrum processing the plurality of subchannels of data, thereby generating a plurality of spread-spectrum-subchannel signals" is a plurality of multiplication circuits or exclusive-or gates that multiply a plurality of subchannels of data by a plurality of pseudonoise (PN) chip-sequence signals, respectively.	a plurality of devices for processing the plurality of subchannels of data with one or more codes that distributes the signal across the available bandwidth, thereby generating a plurality of signals which correspond to each of the subchannels of data

a plurality of despreading devices for detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal, as a first plurality of detected spread-spectrum signals and a second plurality of detected spread-spectrum signals, respectively	9, 33	The phrase "despreading device" means "a device in the receiver that reverses the spreading operation that occurred in the transmitter." The phrase "detecting, at each receiver antenna of the plurality of receiver antennas" means "process of determining the presence of, and recovering the multipath spread spectrum signals received at each antenna port." Linex does not believe that the construction of this phrase should be governed by 35 U.S.C. § 112(6).	This phrase is a means plus function claim element. The corresponding structure that performs the function of "detecting, at each receiver antenna of the plurality of receiver antennas, the first spread-spectrum signal and the second spread-spectrum signal" is a plurality of matched filters matched to the plurality of pseudonoise (PN) chip sequences.	a plurality of devices in the receiver that reverses the spreading operation that occurred in the transmitter for determining the presence of and recovering both the first multipath spread-spectrum signal and second multipath spread-spectrum signal received at each antenna port